

# GI15T03

## N-CHANNEL ENHANCEMENT MODE POWER MOSFET

|         |      |
|---------|------|
| BVDSS   | 30V  |
| RDS(ON) | 80mΩ |
| ID      | 12A  |

### Description

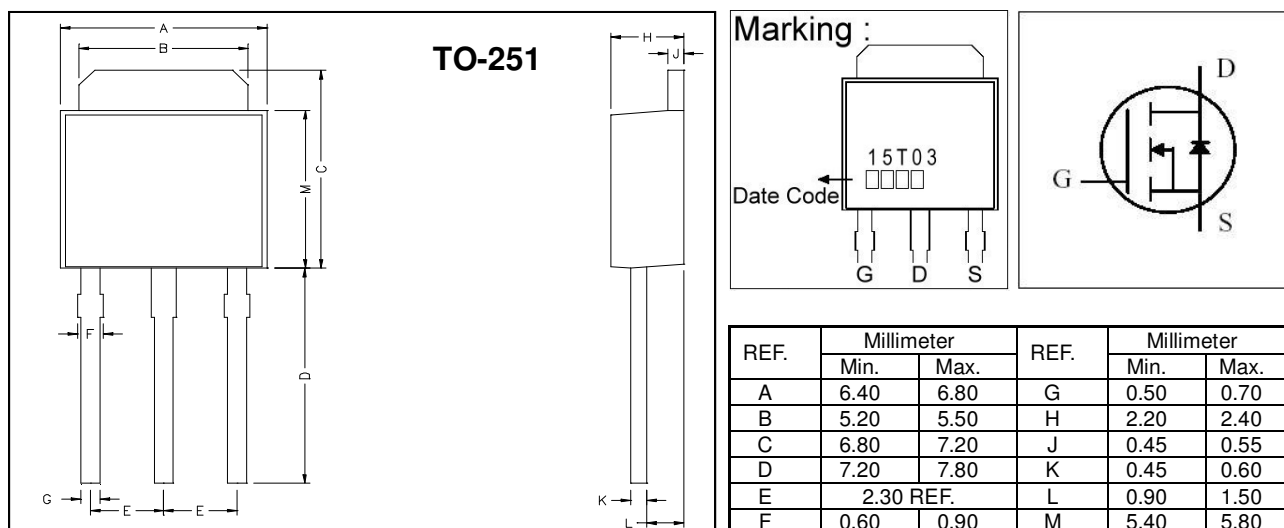
The GI15T03 provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The through-hole version (TO-251) is available for low-profile applications and suited for low voltage applications such as DC/DC converters.

### Features

- \*Low Gate Charge
- \*Simple Drive Requirement
- \*Fast Switching Characteristic

### Package Dimensions



### Absolute Maximum Ratings

| Parameter  | Symbol                  | Ratings    | Unit |
|--|-------------------------|------------|------|
| Drain-Source Voltage                             | $V_{DS}$                | 30         | V    |
| Gate-Source Voltage                              | $V_{GS}$                | ±20        | V    |
| Continuous Drain Current                         | $I_D @ T_C=25^\circ C$  | 12         | A    |
| Continuous Drain Current                         | $I_D @ T_C=100^\circ C$ | 6.4        | A    |
| Pulsed Drain Current <sup>1</sup>                | $I_{DM}$                | 50         | A    |
| Total Power Dissipation                          | $P_D @ T_C=25^\circ C$  | 12.5       | W    |
| Linear Derating Factor                           |                         | 0.1        | W/°C |
| Operating Junction and Storage Temperature Range | $T_j, T_{stg}$          | -55 ~ +150 | °C   |

### Thermal Data

| Parameter                                | Symbol      | Value | Unit |
|--|-------------|-------|------|
| Thermal Resistance Junction-case Max.    | $R_{thj-c}$ | 10    | °C/W |
| Thermal Resistance Junction-ambient Max. | $R_{thj-a}$ | 110   | °C/W |

**Electrical Characteristics (T<sub>j</sub> = 25°C unless otherwise specified)**

| Parameter   | Symbol                         | Min. | Typ. | Max. | Unit | Test Conditions   |
|---|--------------------------------|------|------|------|------|---|
| Drain-Source Breakdown Voltage                      | BV <sub>DSS</sub>              | 30   | -    | -    | V    | V <sub>GS</sub> =0, I <sub>D</sub> =250uA   |
| Breakdown Voltage Temperature Coefficient           | $\Delta BV_{DSS} / \Delta T_j$ | -    | 0.02 | -    | V/°C | Reference to 25°C, I <sub>D</sub> =1mA  |
| Gate Threshold Voltage                              | V <sub>GS(th)</sub>            | 1.0  | -    | 3.0  | V    | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA  |
| Forward Transconductance                            | g <sub>fs</sub>                | -    | 7    | -    | S    | V <sub>DS</sub> =10V, I <sub>D</sub> =8A  |
| Gate-Source Leakage Current                         | I <sub>GSS</sub>               | -    | -    | ±100 | nA   | V <sub>GS</sub> = ±20V  |
| Drain-Source Leakage Current(T <sub>j</sub> =25°C)  | I <sub>DSS</sub>               | -    | -    | 1    | uA   | V <sub>DS</sub> =30V, V <sub>GS</sub> =0  |
| Drain-Source Leakage Current(T <sub>j</sub> =150°C) |                                | -    | -    | 25   | uA   | V <sub>DS</sub> =24V, V <sub>GS</sub> =0  |
| Static Drain-Source On-Resistance <sup>2</sup>      | R <sub>DS(ON)</sub>            | -    | -    | 80   | mΩ   | V <sub>GS</sub> =10V, I <sub>D</sub> =8A  |
|   |                                | -    | -    | 100  |      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A   |
| Total Gate Charge <sup>2</sup>                      | Q <sub>g</sub>                 | -    | 4    | 7    | nC   | I <sub>D</sub> =8A<br>V <sub>DS</sub> =24V<br>V <sub>GS</sub> =4.5V   |
| Gate-Source Charge                                  | Q <sub>gs</sub>                | -    | 1.4  | -    |      |   |
| Gate-Drain ("Miller") Change                        | Q <sub>gd</sub>                | -    | 2.4  | -    |      |   |
| Turn-on Delay Time <sup>2</sup>                     | T <sub>d(on)</sub>             | -    | 6    | -    | ns   | V <sub>DS</sub> =15V<br>I <sub>D</sub> =8A<br>V <sub>GS</sub> =10V<br>R <sub>G</sub> =3.3Ω<br>R <sub>D</sub> =1.88Ω |
| Rise Time   | T <sub>r</sub>                 | -    | 22   | -    |      |   |
| Turn-off Delay Time                                 | T <sub>d(off)</sub>            | -    | 11   | -    |      |   |
| Fall Time   | T <sub>f</sub>                 | -    | 2.4  | -    |      |   |
| Input Capacitance                                   | C <sub>iss</sub>               | -    | 280  | 450  | pF   | V <sub>GS</sub> =0V<br>V <sub>DS</sub> =25V<br>f=1.0MHz   |
| Output Capacitance                                  | C <sub>oss</sub>               | -    | 70   | -    |      |   |
| Reverse Transfer Capacitance                        | C <sub>rss</sub>               | -    | 47   | -    |      |   |
| Gate Resistance                                     | R <sub>g</sub>                 | -    | 1.1  | -    | Ω    | f=1.0MHz  |

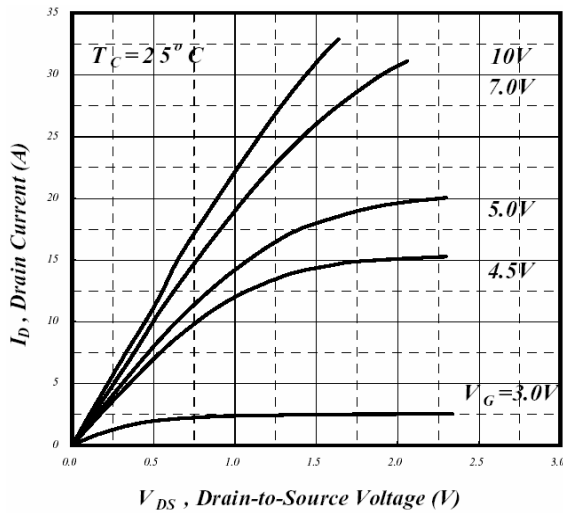
**Source-Drain Diode**

| Parameter                          | Symbol          | Min. | Typ. | Max. | Unit | Test Conditions  |
|------------------------------------|-----------------|------|------|------|------|--|
| Forward On Voltage <sup>2</sup>    | V <sub>SD</sub> | -    | -    | 1.3  | V    | I <sub>S</sub> =8A, V <sub>GS</sub> =0V                  |
| Reverse Recovery Time <sup>2</sup> | T <sub>rr</sub> | -    | 17   | -    | ns   | I <sub>S</sub> =8A, V <sub>GS</sub> =0V<br>di/dt=100A/μs |
| Reverse Recovery Charge            | Q <sub>rr</sub> | -    | 7    | -    | nC   |  |

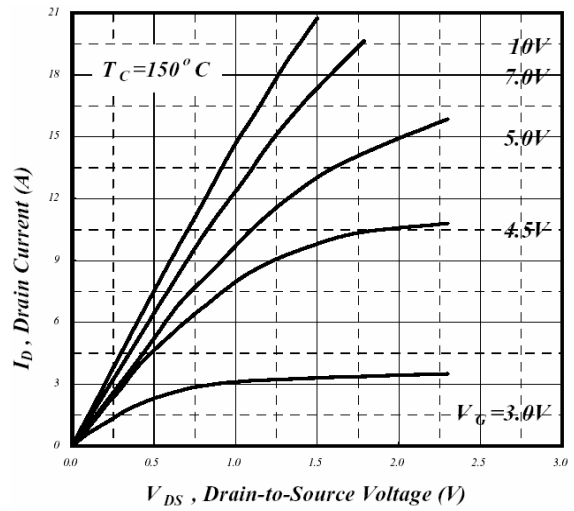
Notes: 1. Pulse width limited by safe operating area.

2. Pulse width ≤ 300us, duty cycle ≤ 2%.

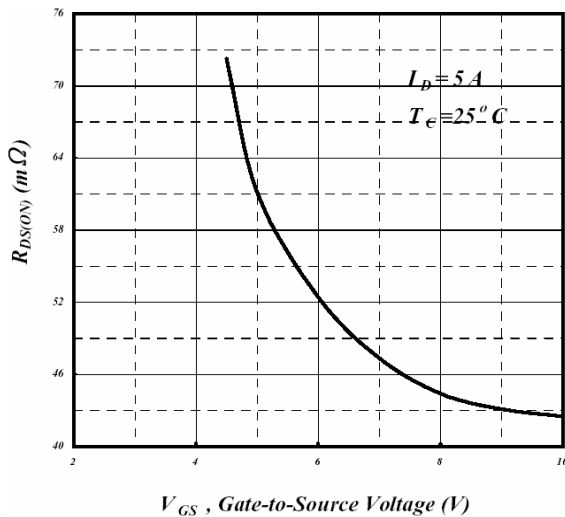
## Characteristics Curve



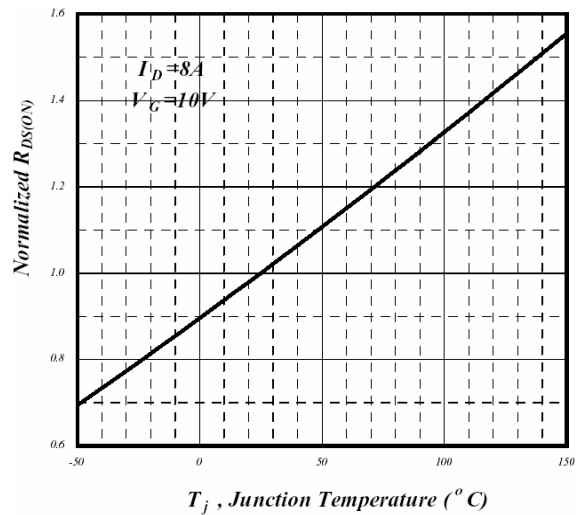
**Fig 1. Typical Output Characteristics**



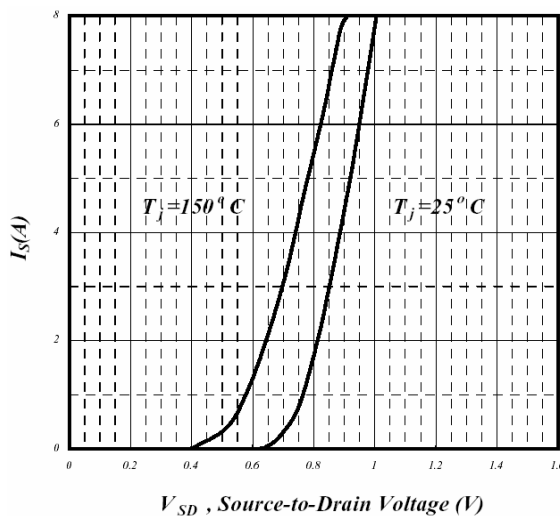
**Fig 2. Typical Output Characteristics**



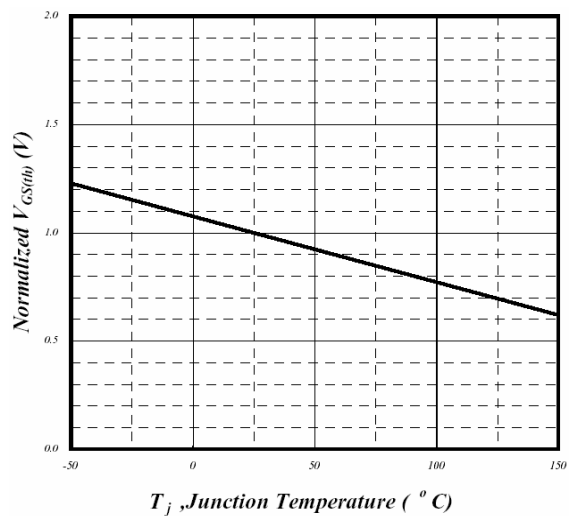
**Fig 3. On-Resistance v.s. Gate Voltage**



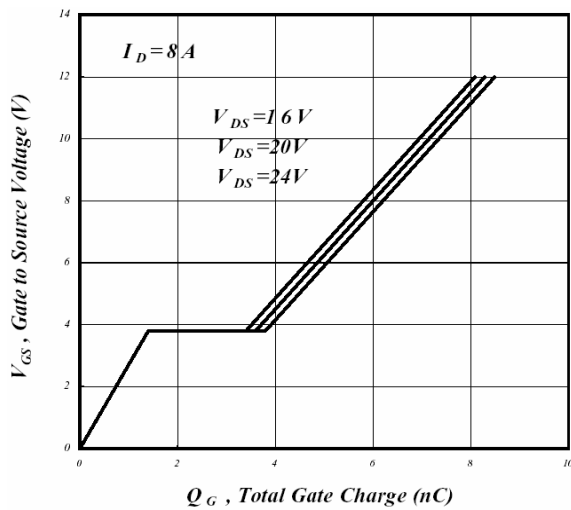
**Fig 4. Normalized On-Resistance v.s. Junction Temperature**



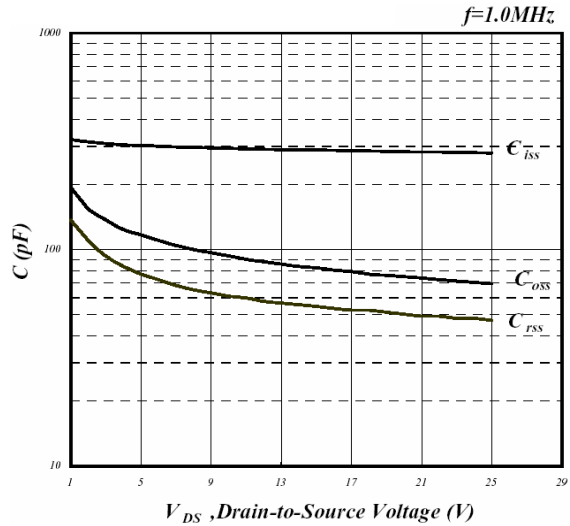
**Fig 5. Forward Characteristics of Reverse Diode**



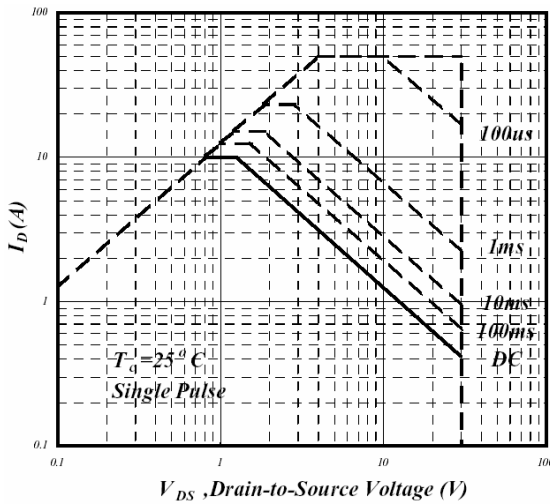
**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**



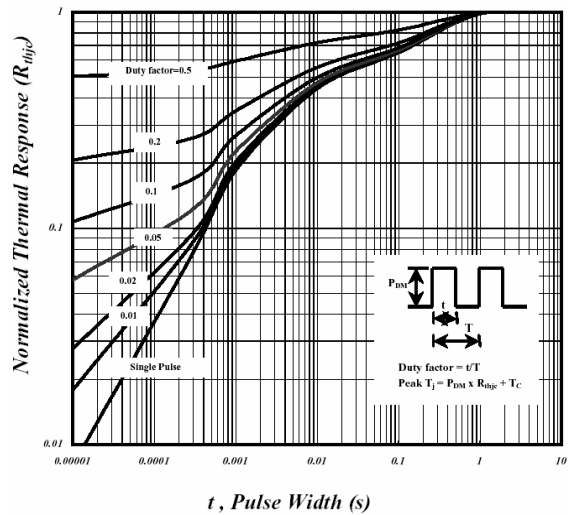
**Fig 7. Gate Charge Characteristics**



**Fig 8. Typical Capacitance Characteristics**



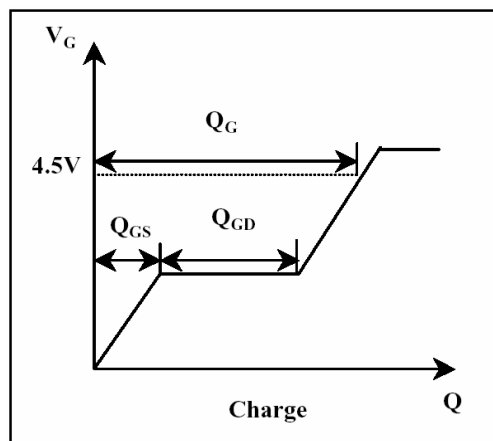
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**



**Fig 11. Switching Time Waveform**



**Fig 12. Gate Charge Waveform**

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